EVALUATION OF VISCOTAQ® PIPELINE WRAP PERFORMANCE RELATED TO CRUDE OIL EXPOSURE

Progress Summary

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EERC DISCLAIMER

LIST OF FIGURES

EVALUATION OF VISCOTAQ® PIPELINE WRAP PERFORMANCE RELATED TO CRUDE OIL EXPOSURE: PROGRESS SUMMARY

Portions of the test box were fabricated at the Energy & Environmental Research Center (EERC) in May, and Chuck Holt, a representative from Pro-Kote Engineering and Supply, arrived at the EERC on June 2, 2015, to wrap the pipes with the VISCOTAQ® Bell and Spigot Sealing System before inserting the pipes into the test box (Figure 1). Once the pipes were inserted, the box was reinforced and tested for leaks by filling it with water. The pipes were also flushed with water and tested for leaks. After the leak checks were completed, the pipes were flushed several times with tap water and distilled water and tested until the total organic carbon (TOC) levels were down to background levels (< 1 mg/L). They were then filled with distilled water, and the internal water pressure in each pipe was adjusted to meet the psi proposed in the final test plan.

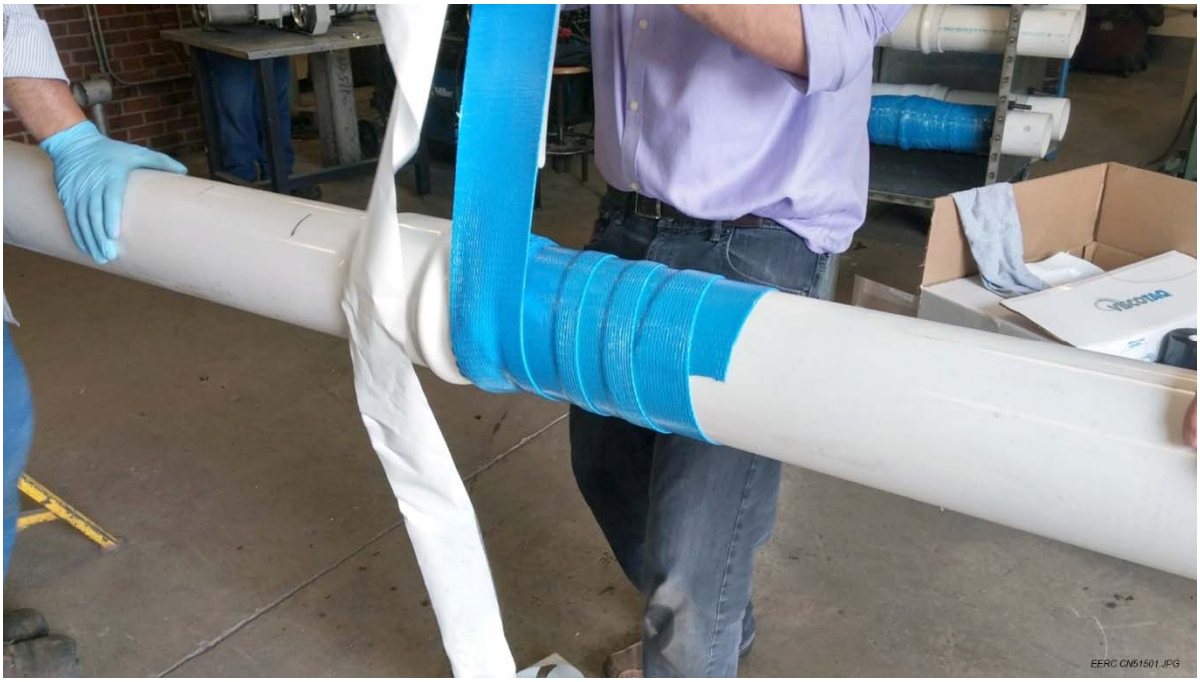

Figure 1. VISCOTAQ wrap being applied by Chuck Holt on June 2, 2015.

The descriptions of the six test pipes are as follows (shown in Figure 2):

Pipe No. 1: Single wrap extending to the flanges on the internal walls of the box and sealed with silicone. Internal water pressure of 35 psi.

Pipe No. 2: No wrap. Internal water pressure of 35 psi.

Pipe No. 3: Single wrap with no silicone sealant. No internal water pressure.

Pipe No. 4: Double wrap with no silicone sealant. Internal water pressure of 35 psi.

Pipe No. 5: Single wrap with no silicone sealant. Internal water pressure of 35 psi.

Pipe No. 6: No wrap. No internal water pressure.

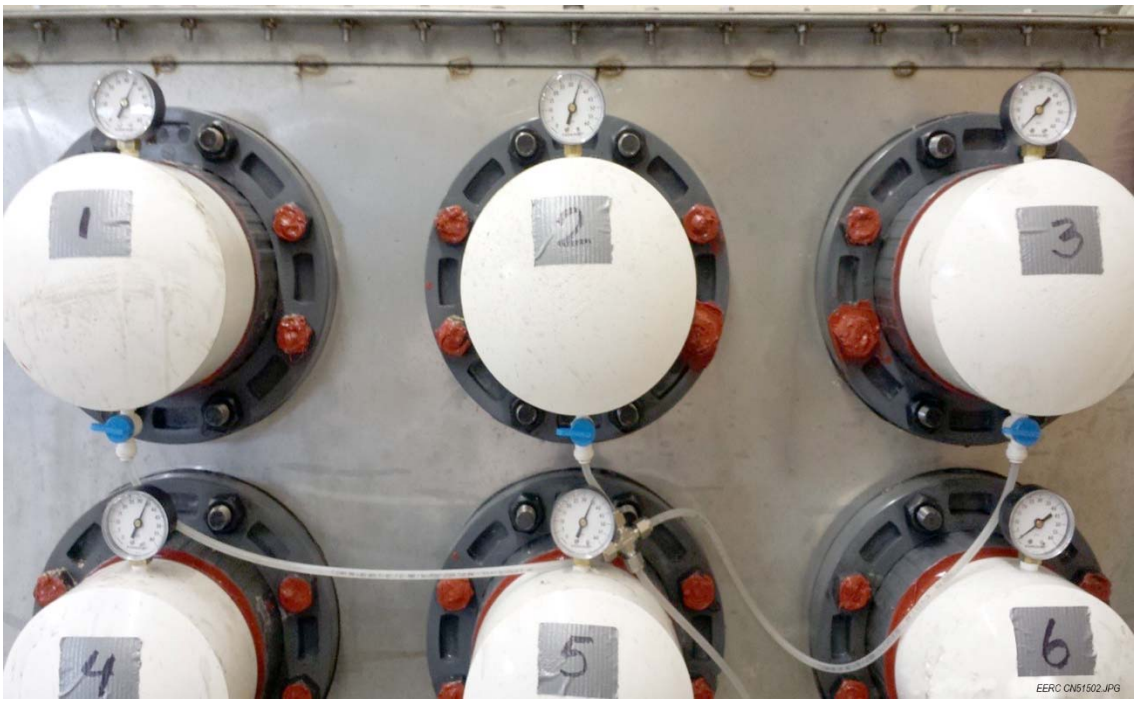

Figure 2. End view of pipes after the internal water pressures were adjusted.

On June 11, 2015, the box was filled with a mixture of damp sand and Bakken crude oil. The sand and oil were added in layers by filling the box approximately one-third full with sand (Figure 3) and then pouring 20 gallons (four 5-gallon pails) of crude slowly over the sand, which was readily absorbed (Figure 4). This was followed by another layer of sand and 20 gallons of oil and then a final layer of sand and 15 gallons of oil (Figures 5–7). This resulted in a completely saturated sand–oil mixture (Figure 8). The test box was covered and bolted along the edges. A pressure release valve was installed in the center of the top cover with a pipe vent to an exhaust fan.

Figure 3. Top view of box after the first layer of sand was added.

Figure 4. The first 20 gallons of crude oil being added.

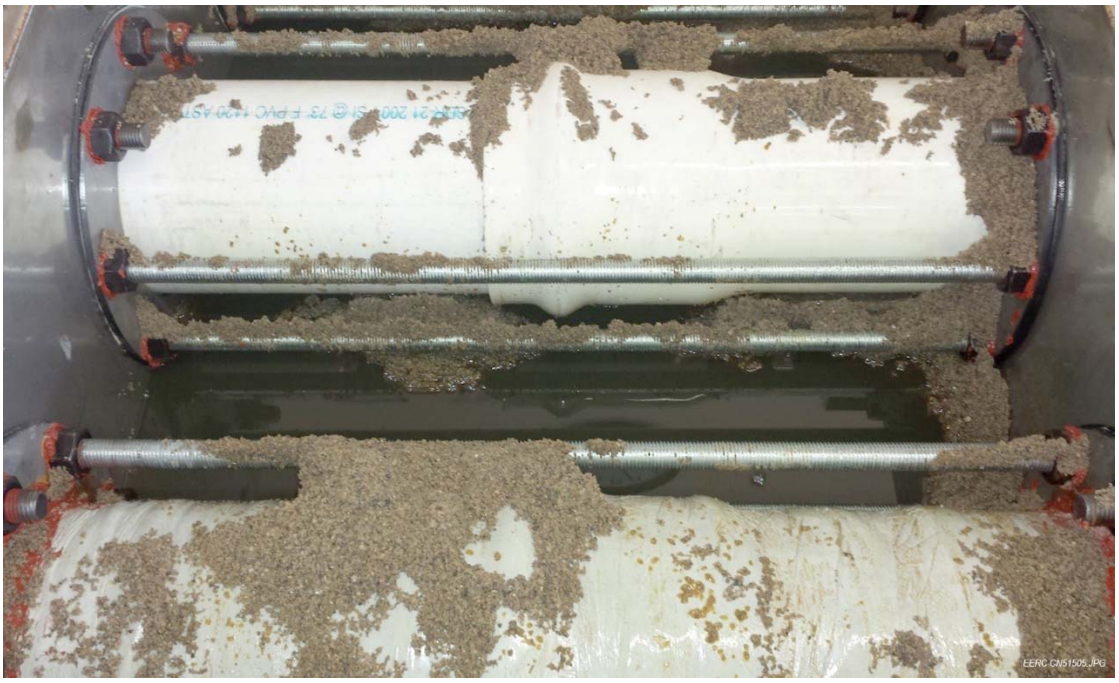

Figure 5. Top view of box after the second layer of sand was added.

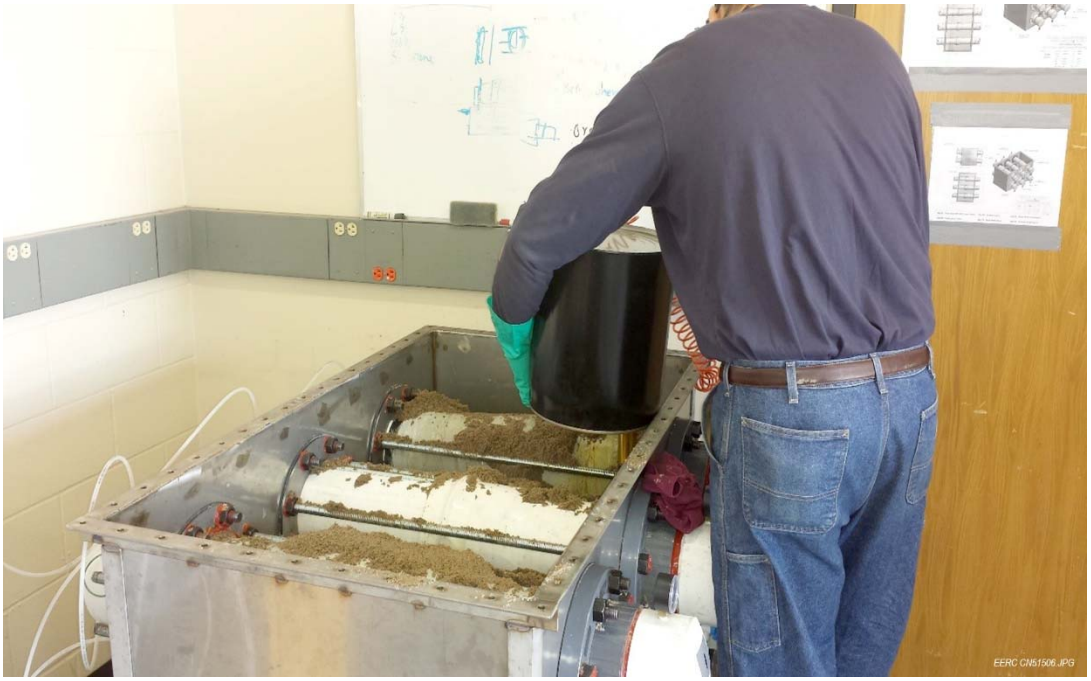

Figure 6. The second 20 gallons of crude oil being added.

Figure 7. The final addition of crude oil.

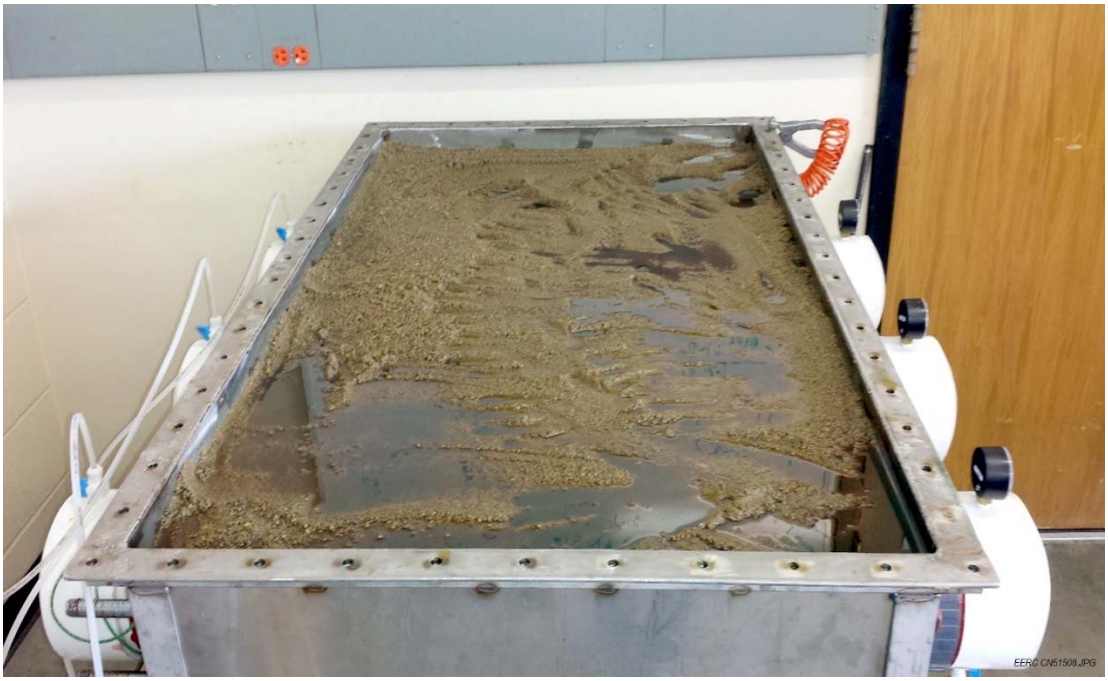

Figure 8. View of the fully saturated sand before the top cover is applied.

The first test samples were taken on June 16, 2015, and analyzed for TOC. The levels were slightly above baseline, however, highly consistent among all six pipes. The results ranged from 7–9 mg/L TOC. Because of the consistent readings in all of the pipes, it appears that the TOC is not a result of a hydrocarbon leak, but rather something leaching from the pipe materials. Subsequent sampling and analysis will determine if this is the case. Weekly samples will be taken for the first month, then biweekly for Months 2 and 3, and every third week for Months 4 through 6.

A separate tension experiment is being conducted on a seventh pipe that was wrapped with the VISCOTAQ bell and spigot sealing system. The pipe is mounted on a wall with 30 lb of tension applied and will be monitored with a spring scale to determine if the tension changes over time (Figures 9 and 10).

Figure 9. The wall-mounted pipe used for the tension experiment.

Figure 10. The spring scale showing 30 lb on Day 1 of the tension experiment.